Remarks

In the Office Action, the Examiner noted that claims 1-50 are pending in the application, and that claims 1-50 are rejected. By this amendment, claims 1, 6, 8-10, 12, 15, 22, 24, 25, 28, 36, 39, 45, and 48 have been amended. Claims 31-33 and 40-44 have been canceled. Thus, claims 1-30, 34-39, and 45-50 are pending in the application.

Applicant hereby requests further examination and reconsideration of the application, in view of the foregoing amendments.

In the Specification

In the specification, the table on page 1 has been amended to identify the co-pending applications by their serial numbers.

In the Claims

Rejection Under 35 USC 112 second paragraph

The Examiner rejected claim 22 under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicant has amended the claim to distinctly claim the subject matter that Applicant regards as his invention.

Rejection Under 35 USC 102(b)

The Examiner rejected claims 1, 2, 15-21, 23-40, 43, 44, 45, 48, and 50 under 35 U.S.C. § 102(b), as being anticipated by *Emma, et al.*, U.S. Patent No. 5,353,421 (hereinafter *Emma*). Applicant respectfully traverses the rejection of claims 1, 2, 15-21, 23-30, 34-39, 45, 48, and 50.

Claim 1 has been amended to include the limitation that the first and second predictors make predictions of a target address of an unconditional branch instruction. Applicant respectfully asserts that claim 1 as amended is not anticipated by *Emma*. In particular, *Emma* does not teach making two predictions of a target address of an unconditional branch instruction. Rather, *Emma* teaches a branch prediction mechanism that makes at least two predictions of conditional branch instructions. Abstract; col. 1, lines 10-13; col. 4, lines 7-14; col. 5, lines 33-36.

Applicant respectfully asserts *Emma* does not anticipate independent claims 28, 36, and 45 for the same reasons discussed above with respect to claim 1.

Applicant respectfully asserts *Emma* does not anticipate dependent claims 2-27, 29-30, 37-39, and 46-50 because they depend from independent claims 1, 28, 36, and 45, respectively, which are not anticipated by *Emma* for the reasons discussed above.

Rejection Under 35 USC 103

Claim 22

The Examiner rejected claim 22 under 35 U.S.C. § 103, as being unpatentable over *Emma*. Applicant respectfully traverses the rejection of claim 22. Applicant respectfully asserts *Emma* does not obviate dependent claim 22 because it depends from independent claim 1, which is not anticipated or obviated by *Emma* for the reasons discussed above.

Claims 3-5, and 47

The Examiner rejected claims 3-5, 41, and 47 under 35 U.S.C. § 103, as being unpatentable over *Emma* in view of *Gochman, et al.*, U.S. Patent No. 5,964,868 (hereinafter *Gochman*). Applicant respectfully traverses the rejection of claims 3-5 and 47.

With respect to claims 3, 41, and 47, the Examiner asserts that it would have been obvious to have the branch instruction type of *Emma* specify whether the branch instruction is a return type branch instruction as taught by *Gochman* for the desirable purpose of being able to implement a speculative return stack buffer so that instructions can continue to be fetched while a main memory access occurs. Applicant respectfully asserts that the references do not supply the motivation to combine the elements of *Emma* and *Gochman* suggested by the Examiner; therefore, the rejection is improper.

Emma and *Gochman* involve branch prediction mechanisms which are very different in important respects. Generally speaking, *Emma* teaches making a first branch prediction at instruction fetch time, then subsequently making a second branch prediction at instruction decode time, and then selectively overriding the first prediction with the second prediction based on a set of rules. Abstract. In contrast, *Gochman* does not teach making multiple branch predictions, much less overriding one prediction with the other.

Rather, *Gochman*'s Actual Return Stack Buffer stores information from fully executed branch instructions and is used for correcting the Speculative Return Stack Buffer upon detection of a misprediction once the branch instruction is actually executed, not to make a second prediction. Abstract. Second, *Gochman* teaches determining at instruction fetch time that the branch instruction is a return type instruction (Fig. 2); whereas, *Emma* teaches generating the branch instruction type in response to decoding the branch instruction. Third, continuing to access instructions while a main memory access occurs is an independent desirable benefit of return stack buffers, and is not related to the notion of making multiple sequential branch predictions, much less to overriding one prediction with another. For the reasons stated, Applicant respectfully asserts the references did not provide a motivation to a person of ordinary skill in the art to combine *Gochman*'s provision of a return branch type with *Emma*'s branch prediction mechanism at the time the invention was made; hence, Applicant's invention, viewed as a whole, would not have been obvious, and the Examiner may not in hindsight use Applicant's claim as a pattern to piece together elements from the prior art.

Claims 6-14, 46 and 49

The Examiner rejected claims 6-14, 42, 46, and 49 under 35 U.S.C. § 103, as being unpatentable over *Emma* in view of *Rappoport, et al.*, U.S. Patent No. 6,601,161 (hereinafter *Rappoport*). Applicant respectfully traverses the rejection of claims 6-14, 46, and 49.

With respect to claim 12 as representative of the rejected claims, the Examiner asserts that it would have been obvious to have the branch instruction type of *Emma* specify whether the branch instruction is an indirect branch type instruction for the desirable purpose of using the predictor that most accurately predicts indirect branches. Applicant respectfully asserts that the references do not supply the motivation to combine the elements of *Emma* and *Rappoport* suggested by the Examiner; therefore, the rejection is improper.

First, *Emma* and *Rappoport* involve branch prediction mechanisms which are very different in important respects. Generally speaking, *Emma* teaches making a first branch prediction at instruction fetch time, then subsequently making a second branch prediction

at instruction decode time, and then selectively overriding the first prediction with the second prediction based on a set of rules. In contrast, *Rappoport* teaches making two branch predictions at the same time and selecting one of the predictions based on the branch instruction type, not subsequently overriding one prediction with the other. Second, *Rappoport* teaches providing the branch instruction type from his BTB, which is based on a history of previous branch instruction executions; whereas, *Emma* teaches generating the branch instruction type in response to decoding the branch instruction. For the reasons stated, Applicant respectfully asserts the references did not provide a motivation to a person of ordinary skill in the art to combine *Rappoport*'s provision of an indirect branch type with *Emma*'s branch prediction mechanism at the time the invention was made; hence, Applicant's invention, viewed as a whole, would not have been obvious, and the Examiner may not in hindsight use Applicant's claim as a pattern to piece together elements from the prior art.

The Examiner has indicated additional prior art which is made of record and not relied upon. None of these references anticipate or obviate applicant's invention.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Applicant earnestly requests the examiner to telephone him at the direct dial number printed below if the examiner has any questions or suggestions concerning the application.

Respectfully submitted,

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"EXPRESS MAIL" mailing label number EV041359478. Date of Deposit 9-20-04. I hereby certify that this paper is being deposited with the U.S. Postal Service Express Mail Post Office to Addressee Service under 37 C.F.R. §1.10 on the date shown above and is addressed to the U.S. Commissioner of Patents and Trademarks, Alexandria, VA, 22313.

By: Vicki J. Hoy